

**Abstract**

A radar system determines the range and velocity of a target, such as an atmospheric structure.

The radar system transfers a first series of pulses and a second series of pulses. The first series of pulses and the second series of pulses have orthogonal polarizations. The first series of pulses and the second series of pulses have a same pulse repetition time. The first series of pulses and the second series of pulses are offset by a time amount. The target reflects energy from the first series of pulses to generate a first series of echoes and reflects energy from the second series of pulses to generate a second series of echoes. The radar system processes the first series of echoes and the second series of echoes to determine the range and velocity of the target.